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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •

MARCH 23, 1935

Dionaea's Trap Uncloses

See Page 188

A SCIENCE SERVICE PUBLICATION

SCIENCE NEWS LETTER

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The Weekly Summary of Current Science

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SCIENCE SERVICE

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Edited by WATSON DAVIS

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DO YOU KNOW?

Five years is the average duration of a case of tuberculosis.

An international park on both sides of the Texas-Mexico line is proposed by Secretary of the Interior Ickes.

A psychologist found that out of 40 children selected at random 13 per cent. played with imaginary companions.

Experiments have showed that sweet corn loses its sweetness six times as fast kept at 86 degrees Fahrenheit as at 32.

Soft rubber is usually vulcanized with five per cent. or less of sulphur whereas in hard rubber as much as 50 per cent. sulphur may be used.

Millions of green parrots descended recently like a plague upon a sheep station in southern Australia, polluting the water for ranchers and their stock.

Although the "germ" causing rheumatic fever, sometime. called inflammatory rheumatism, is not definitely known, doctors believe that it may be caused by the same bacterium responsible for tonsillitis and St. Vitus' Dance.

Some insects, as well as birds, migrate regularly every year.

The most complicated systems of kinship man has devised are found among the primitive Australian natives.

The oyster is a useful food for treating nutritional anemia, since it contains almost as much iron and copper as does liver.

German scientists are experimenting with tobacco plants which they hope will produce 45 to 60 leaves, instead of the normal 15 to 20.

Study of spiders in northern countries indicates that Greenland's spiders are mainly American species, whereas Iceland's spiders are European.

The Field Museum's Hall of the Races of Mankind now contains 101 life-sized sculptures, portraying racial types from all parts of the world.

Cloth from milkweed floss and cotton staple mixed has so far not been very successful, but experiments to make use of milkweed fibers are being continued.

WITH THE SCIENCES THIS WEEK

Most articles are based on communication to Science Service or papers before meetings, but where published sources are used they are referred to in the articles.

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ZOOLOGY

How many buffalo have western Indians received? p. 184.

PHYSICS

Source of Rare Hydrogen Isotope Made at Princeton

Entire Year's Work by Chemist Yields Ten Drops Of Fluid Rich in Tritium from 75 Tons of Water

BY "boiling down" seventy-five tons of water over a period of a year, ten drops of the precious liquid, richer in the rare "hydrogen three" isotope than any ever made before, has at last been obtained by the chemistry department of Princeton University.

According to Prof. Hugh S. Taylor, chairman of the department, who described the work before the Electrochemical Society, one part in ten thousand of the half gram is fluid in which the hydrogen is of mass three instead of mass one as in ordinary water.

In the drinking variety of water the rare isotope of hydrogen is present to the extent of only one part in ten thousand million (10,000,000,000).

Such extremely minute concentrations are comparable with those encountered by Madame Marie Curie and her husband in their original experiments on the extraction of the element radium from its ores. Radium ore which will yield one-half gram of radium for five tons of ore is considered remarkably rich. Radium ores producing a half gram of radium for 100 tons of ore are worked commercially.

Explaining the work on tritium, Prof. Taylor said:

"In addition to the hydrogen isotope deuterium of mass 2 discovered by Prof. Harold C. Urey of Columbia University, for which he received the Nobel Prize in 1934, it is now known that a third hydrogen of mass 3 also exists. This still heavier atom of hydrogen has been produced artificially in Cambridge, England, and in Palmer Physical Laboratory of Princeton University by nuclear disintegration processes.

"About a year ago by the use of the mass spectrograph designed by Dr. Walker Bleakney, Princeton physicist, it was shown that the 'heavy water' (deuterium oxide) contained small amounts of the third isotope, tritium, but in a concentration estimated at one part in 200,000 of the 'heavy water' examined.

"During the year the same process of concentration by electrolysis has been continued by Dr. P. W. Selwood of the Frick Laboratory. There now remains a residual ten drops (one-half cubic centimeter) from the electrolysis of 75 tons of ordinary water. The tritium concentration has steadily increased until it is now approximately one part of tritium for every 10,000 parts of deuterium water. The experiments show that in ordinary water this type of hydrogen is present to the extent of only one part in ten thousand million parts of water.

"Similar experiments to ascertain whether the electrolytic process concentrates the heavy oxygen of mass eighteen over that of normal oxygen of mass sixteen have shown that this method is much less efficient. A concentration of water by electrolysis from 120,000 volumes to one volume increased the heavy oxygen concentration merely from one part in 500 to one part in 450.

"While such changes in the ratio of the two species are sufficient for many scientific experiments, it will be necessary to utilize other methods of separation if it is desired to produce pure specimens of the two forms of oxygen similar to those already obtained with deuterium, the heavy hydrogen of mass 2."

Commenting upon the effect the knowledge that hydrogen of mass 3 could be produced by the electrolytic process would have upon scientists, Prof. Taylor predicted that it would intensify the interest in this field which was initiated by the discovery of "heavy water."

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ENGINEERING

Study Why Airplane Propellers Break in Air

NEW KNOWLEDGE of propeller vibration and the possible reasons why propellers break in midair is reported by Dr. Walter Ramberg, Paul S. Ballif and Mack J. West of the National Bureau of Standards. (*Journal of Research*, Feb.)

Such propeller failures, while rare compared with the number of propellers in service, usually have serious consequences. Often the flying broken parts rip through the wings of a plane, cause a wreck and sometimes loss of life.

Because it was almost hopeless to try to measure the size of propeller vibrations and the forces in blades while they were whirling rapidly, the government scientists produced a comparable effect by working backward.

Instead of the propeller receiving its vibrations during actual flight the experimental test was performed with a

LEARNING WHY PROPELLERS FAIL

Scientists of the National Bureau of Standards in Washington test airplane propellers to learn what causes the fairly rare, but usually fatal, propeller breaks in midair. Shown above is the testing room where with fixed blades scientists twist propeller shafts to produce vibrations like those experienced during actual flight. Points where greatest stresses were discovered proved to be the places where propellers broke when they were artificially fractured.

fixed propeller made to undergo the vibrations by having its propeller shaft twisted back and forth mechanically. Thus strains and stresses were experienced in the propeller blade similar to those encountered during normal operation. Most important, they could be measured.

It was found that the vibrations were those of resonance wherein tiny forces, timed at just the right period, built up and amplified one another until the total effect was enough to snap the blade.

It is such resonance vibrations which are feared when a column of troops is ordered to break step when marching across a bridge. If all the footbeats happened to be timed near the natural vibration period of the bridge, the latter might collapse from the built-up stresses created.

For the experimental propellers two vibration periods were found; one at the frequency of 35 times a second and the other 130 times a second. For the lower frequency of vibration it was found that the greatest stresses occurred at the middle of the propeller blade.

Stresses experienced were determined by measurements on a special strain gage invented by Dr. L. B. Tuckerman, also of the Bureau.

In the laboratory the scientists made eight propellers break artificially while vibrating with their fundamental frequency. All the blades broke at the middle where the stresses were within a few per cent. of the maximum measured.

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PHYSICS

British Research Upsets Values for Atomic Weights

New Atomic Weight for Hydrogen, if Verified, Will Make all Atomic Weight Tables Obsolete

A DRASTIC shakeup in science's conception of the weights of the atoms which make up everything in the universe appears imminent from a report to the Royal Society, London, by Prof. M. L. E. Oliphant and A. E. Kempton of Cavendish Laboratories, Cambridge University.

Lord Rutherford, commenting on the discoveries of his Cavendish colleagues, said that as a consequence of their new discoveries in transmutation experiments on the relationship between hydrogen and oxygen in ordinary water, science sees a way to get around what has been a serious conflict in reconciling disintegration experiments with the laws of the conservation of energy.

Due to Error

The worrisome trouble in the past, Lord Rutherford said, appears to have been that the widely recognized measurements on the ratio of the weights of oxygen and hydrogen in water erred by a factor of one part in four thousand.

Correcting Prof. F. W. Aston's measurements made on his original "atom scale," the mass spectrograph, by this factor. Prof. Oliphant finds a beautiful reconciliation for the energies of particles shot out in atom-smashing experiments with the theoretical loss of mass in the process.

The discrepancies in the past have raised the question whether more undiscovered fundamental particles exist. The new Cavendish experiments discount such questions.

The new atomic weight of hydrogen is now 1.0081 instead of 1.0078. If the new finding is substantiated independently, every atomic weight table in the science textbooks of the world will be obsolete, for the weights of the various atoms are all based on the weight of hydrogen. Any changes in the weight of the latter involve all the other 92 elements.

Determining atomic weights by measuring the distance they fly from smashed atoms is now a method more than ten times as accurate as the mass spectrograph, heretofore considered the most accurate of all atom scales, says the report.

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A Swedish anthropologist is studying Indian tribes in the comparativaly little known lowlands of eastern Colombia, along tributaries of the Rio Guaviare.

PUBLIC HEALTH

High Maternal Death Rate Not Explained by Reporting

THE large number of deaths of American mothers in childbirth as compared with mothers in other countries cannot be explained away by laying the blame on methods of reporting, it appears from a study conducted by Dr. Elizabeth C. Tandy of the U. S. Children's Bureau.

"The official figure of the United States, which in the last few years has exceeded that of every country except Scotland, remains high no matter what method of assignment is used," Dr. Tandy states in her report.

Differences in methods of assigning causes of deaths are not enough to explain the high maternal mortality rate in the United States, as compared with foreign countries, Dr. Tandy found.

Even if the method of the country assigning the smallest proportion of deaths to the puerperal state were in use in the United States, the United States figure would still exceed that of all 16 countries included in the study, except Australia, Canada, Chile and Scotland.

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GEOPHYSICS

People Inside the Earth Excited America in 1822

PEOPLE may be living inside the earth. The United States Government ought to send "in" an expedition to explore and find out.

This fantastic theory, which excited America over a century ago, is now arousing scientific attention, and amusement, again. In the rare collections of the Smithsonian Institution, research workers have found a broadside dated September 14, 1822, urging the public to believe in a hollow earth, the interior of which could be entered from North or South Polar regions. A yellowed, fragile pamphlet eloquently denouncing the theory has also come to light.

The broadside was written by the author of this hollow earth theory, Captain John Cleves Symmes, retired army officer, who bombarded the American public and institutions of learning with his geophysical ideas from 1818 to 1829. Groups of loyal Symmesites all over the country arose. Petitions urged Congress to send an expedition up to the vast hole at the North Pole to sail round the gentle curve and explore

"within the concave," as Symmes called the interior. Symmes even thought the earth might consist of several hollow spheres within spheres.

As late as the eighteen seventies, a writer in the *Atlantic Monthly* defended the Symmes theory and predicted that one day the almost forgotten theorist might yet be honored as a great philosopher.

Symmes based his geophysical conclusions on such data as his observations of the planets and far-fetched explanations of Indian lore. While his reasoning has long since been discounted, his persistent plea for exploration of the polar regions is believed to have been one factor leading to the Wilkes expedition, which resulted in turn in the first discovery of land below the Antarctic Circle.

Symmes' theories survive in one of the tales of Edgar Allan Poe, "The Adventures of Arthur Gordon Pym," and possibly in writings of Jules Verne.

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PHYSICS

Einstein's Relativity Defended at Princeton

New Compromise Theory of Indian Mathematician, Sir Shah Sulaiman, Criticized in Report to Science

LOOPHOLES in the mathematical armor of the new theory of relativity proposed by Sir Shah Sulaiman, Indian justice and mathematician, are found by scientists of Princeton University.

Sir Shah's theory claimed to be a workable hypothesis midway between the old classical theory of Sir Isaac Newton and the relativity of Prof. Albert Einstein. (*See SNL,* Dec. 1, 1934).

Prof. Harlow Shapley, director of Harvard College Observatory, characterized the Indian theory as one of the high-lights in astronomy for 1934.

D. R. Hamilton, under the direction of Prof. H. P. Robertson of the physics department at Princeton, points out, (*Science,* March 15) that Sir Shah's theory can hardly be classed as new because it rests on the concept of fine particles called "gravitons" which are responsible for the pull of gravity. This concept he says, "is essentially the same as that put forward by LeSage in 1764."

Carrying out calculations with Sulaiman's formulae, Mr. Hamilton found the speed of propagation of gravity through space would have to be from 60,000 to 200,000 times that of light. Light travels at the speed of 186,000 miles a second.

Other calculations on the orbit of the planet Mercury, again using Sir Shah's formulae, reveal that within 300 years the planet would no longer be swinging about the sun in an ellipse but would go off on a parabolic path which would take it far from the solar system.

Although Prof. Einstein is nowhere mentioned in the Princeton report, his presence at the neighboring Institute for Advanced Study at Princeton, N. J., lends added interest to speculations on how much Mr. Hamilton's paper is a defense of Einstein's relativity theories.

Prof. Robertson, under whom the Princeton criticism was directed, is a close friend of Prof. Einstein and accompanied the distinguished scientist to Pittsburgh when he spoke to mathematicians and physicists at the meeting of the American Association for the Advancement of Science there during the Christmas holidays.

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ARCHAEOLOGY

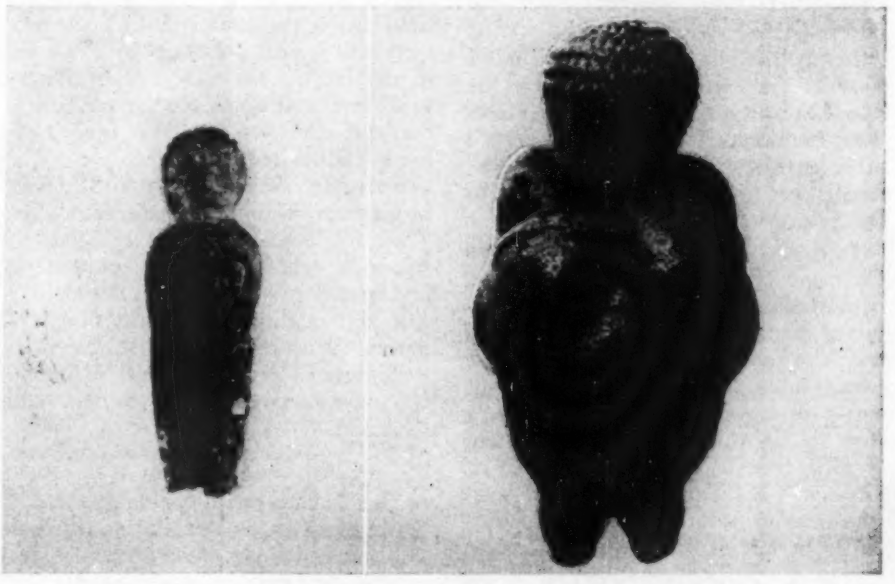
Stone Age Venuses Were Not All Fat

DID STONE Age Siberians like their womenfolk slim while western Europeans of the same date preferred them fat?

Perhaps, and then again perhaps not. It is hard to probe the motives of people who have been dead 30,000 years.

But speculation over feminine types and the place of women in Stone Age society is raised by the discovery in Siberia of slender little female figurines.

Scientists have found the sculptured art of the Aurignacian period of the Old Stone Age before. But these figures of women were fat, grotesquely fat. The rare figures emerged in digging in France, Germany, Austria, and other countries. Aurignacian Venuses, science dubbed them, until the term promptly conjures up a vision of over-stuffed womanhood. The Venus part of the name was given because of the scientific theory that these statuettes of women bear some remote connection with the goddess of love. Just as Stone Age hunters painted deer and mammoth pictures on cavern walls, figuring that painting a



NOT ALL FAT

From Siberia comes this slim figure of a woman (left) carved in mammoth bone by a sculptor of the Aurignacian period of the Old Stone Age. Aurignacian Venuses heretofore discovered have been inclined to excessive fat and ungainliness, as the Venus of Willendorf, Austria, (right) a stone figurine four and one-half inches high.

wounded animal would, by magic, bring the real animal more easily into the hunter's power, so the figurines of women are believed to have served a purpose of magic. Desire for love and children is held responsible for the strange art.

But now comes the Siberian discovery, to show that not all sculptors of the stone age of art made women grotesquely fat. Twenty female Aurignacian images have been discovered in eastern Siberia at the village of Malta. Photographs of several of these figurines which have reached this country show slender lines, none of the exaggerations of the typical prehistoric Venuses.

Russian archaeologists pronounce the figures objects of religious cult, and goddesses. Whether the Eastern Venuses will be fitted into a picture of Stone Age woman as something more than a mate and mother, remains to be seen.

Soviet scientists have been conducting an extensive hunt for new evidences of the Old Stone Age in their part of the world. No less than 62 sites where ancient man took shelter or buried his dead are now known in Soviet Union territory, it is announced.

The camp and burial ground at Malta, revealed by a farmer digging a cellar, has been excavated by the archaeologist, M. Gerasimov, and the numerous relics of Stone Age existence have been transferred from the farm cellar to the Academy of Science at Leningrad.

Besides the twenty Venuses, in evidence of some ancient religious cult, the site has yielded objects used in everyday life or placed with the dead for their use. Among the familiar articles of use in this remote age in Siberia are coal bracelets, beads made of fish vertebrae, buttons of deer horn, needles, pins, pointed weapons of mammoth bone and flint. The skeleton of one three-year-old child was found covered with a large array of such ornaments and possessions characteristic of human existence long ago.

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RADIO

Argentina to London Record Of Ultra-Short Radio Waves

A WORLD'S record for long distance transmission of ultra-short radio waves was achieved when the Buenos Aires, Argentina, radio station LSL was heard in London, 6,000 miles away. The waves that carried the record-breaking signal were the station's "first harmonics," having a wavelength of seven meters. Their fading characteristic was quite different from that of the primary fourteen-meter signal.

Engineers of the British Broadcasting Company (BBC) are greatly interested, because there is evidence that the seven-meter signal was carried by reflected waves, after the fashion of the longer wavelengths, and were not refraction waves or waves of optical nature with their straight-line range extended by starting from a great height, as in an airplane. Hitherto all ultra-short wave transmission records have been established by one of these two methods.

The new record is far in excess of the old one that stood until recently, which was only from Berlin to London.

The British Broadcasting Company is especially interested in the reported new long-range record for ultra-short waves, because it expects to start television broadcasting on a seven-meter band during the coming fall. Their pictures will scan at a fineness of 240 lines to the inch. The new Buenos Aires-London record holds out the possibility that this television broadcast may reach much farther than expected.

Television broadcasts are also to start in Germany within the next few months. They will probably scan at 180 lines to the inch, with 25 frames per second, and have been announced as the world's first high-quality regular television programs. With the new British television broadcasts in prospect, a sort of unofficial race looms between Britain and Germany.

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To the Empress Josephine goes credit for holding the first exhibition of roses.

The American Museum of Natural History has received from Texas an Imperial Mammoth tusk 15 feet 4 inches long, believed to have weighed as fresh ivory almost 300 pounds.

BACTERIOLOGY

War Against Bacteria Only Sporting Proposition

BACTERIOLOGISTS—disease fighters—have for some years been presented to a sentimental public as heroes and martyrs. The bacteriologists themselves are alternately disgusted and amused by the lionizing.

An eminent member of their band now explains how they really feel about their work and answers the question, "How do bacteriologists get that way?"

Bacteriology is a sporting proposition, says Dr. Hans Zinsser in his new book, "Rats, Lice and History" (Little, Brown and Co.)

The desire to do good is the last reason why men go into this work, he thinks. The underlying motive is a love of adventure and a longing for excitement. In our modern world bacteriology is almost the only field in which a man can find excitement. Just as the British cavalry officers took to fox-hunting when there were no wars to be fought, the "men against death" have chosen to fight the microscopic organisms that prey on mankind.

Microbes are no less ferocious than dragons. A bacteriologist, Dr. Zinsser would have us believe, gets just as much thrill out of his work as the old-time knight in armor who rescued the lovely princess.

"Wars," he points out, "are exercises in ballistics, chemical ingenuity, administration, hard physical labor, and long-distance mass murder. . . . Flying is adventurous enough, but little more than a kind of acrobatics for garage mechanics, like automobile racing. But however secure and well-regulated civilized life may become, bacteria, protozoa, viruses, infected fleas, lice, ticks, mosquitoes, and bedbugs will always lurk in the shadows ready to pounce when neglect, poverty, famine, or war lets down the defenses . . . .

"About the only genuine sporting proposition that remains unimpaired by the relentless domestication of a once free-living human species is the war against these ferocious little fellow creatures, which lurk in the dark corners and stalk us in the bodies of rats, mice, and all kinds of domestic animals; which fly and crawl with the insects, and waylay us in our food and drink and even in our love."

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MEDICINE

Germ Causing Dandruff Found By St. Louis Scientists

A GERM that can produce dandruff and an allied scaling condition of the body "under favorable conditions" has been found by Drs. Morris Moore and Roy L. Kile of the Barnard Free Skin and Cancer Hospital, St. Louis.

The germ is a fungus with the scientific name of *Pityrosporum ovalis*. Under the popular name of "bottle bacillus," it has been accused by many dermatologists of causing dandruff, but this could never be proved because the organism could not be grown outside the body.

The St. Louis investigators have succeeded in growing it by using suitable material. With organisms they grew outside the body they were able to produce dandruff in human volunteers as well as in rabbits and guinea pigs. More of the human guinea pigs developed dandruff when the organism was put into scratches on their skin and a lipid salve was rubbed in than by any other method of inoculation. From this and other evidence, (*Science*, March 15), the investigators concluded that the fungus, *Pityrosporum ovalis*, may produce dandruff and scaling under favorable conditions.

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HOW MUCH LIGHT?

Illuminating engineers recommend the use of a 100-watt lamp in this reading lamp, with light falling directly down onto the page. Prof. Tinker of Minnesota questions that so much light is necessary or desirable for ordinary reading.

OPTICS

Very Powerful Lights Not Needed for Ordinary Reading

YOU NEED not buy electric light bulbs of extremely high wattage in the fear that use of less powerful lights will ruin the eyesight of members of your household, it appears from a survey of research studies by Dr. Miles A. Tinker, of the University of Minnesota. (*American Journal of Optometry*, Feb.)

Reading by lights of lesser intensity does not cause eyestrain unless the eyes are abnormal or the print illegible, Dr. Tinker declares. In fact, the contrary may be true. Lights of the extremely high intensities often recommended as healthful and necessary may cause discomfort by producing glare.

A minimum of from 25 to several hundred foot-candles has been recommended for reading in the home. The foot-candle is a unit of illumination arrived at by dividing the candle power of the light by the square of its distance from the illuminated surface.

For example, suppose this article is read by the light of a bridge or reading lamp shining directly down onto your paper from a distance of about three feet. The bulb, say, is about 60 candle power (60 watts). Then the illumination on the paper would amount to at least 6.6 foot-candles. Experts estimate, however, that the concentration of light caused by the lamp shade might magnify this figure about four times, but this still might leave the illumination below the formerly prescribed minimum of 25 foot candles.

"There is no valid evidence to support the suggestions that the normal eye needs from 25 to several hundred foot-candles of artificial illumination for easy and efficient reading of legible print," Dr. Tinker said.

"For all but abnormal eyes and the reading of illegible print, 10 to 15 foot candles furnish an ample margin of safety in brightness of illumination," he insisted.

This would mean substituting a 25 candle power bulb for the 60 in your close reading lamp with no harm to the eyes, or the 60 watt lamp could be placed at a much greater distance.

Diffusion of light has a great deal to do with the intensity you should use, Dr. Tinker pointed out. With well diffused indirect lighting, the intensity may be increased to any desired level without harm to the eyes, but with direct or indirect systems where the light is not well diffused, the higher intensities result in increased glare and should be avoided, he said.

"If the print paper is glazed or shiny, glare becomes more annoying as the intensity of light which is not well diffused is increased. The paper in many magazines and books has varying degrees of gloss, and the light in the majority of living rooms and offices is not well diffused. Consequently, increase of light intensity usually means increased glare."

"It is highly probable that, with the best diffusion available in the ordinary home and office, the light intensity should not be higher than about 15 foot-candles."

Here are Dr. Tinker's recommendations for reading legible print with the normal eye.

1. For direct lighting with poor distribution, 3 to 5 foot-candles.

2. For combination of direct and semi-indirect illumination frequently found in homes, 5 to 10 foot-candles.

3. For the better degrees of light distribution found in some homes and offices, 10 to 15 foot-candles.

For abnormal eyes, or for difficult eye tasks such as the discrimination of fine details, the intensities should be greatly increased. The diffusion should be adequate, however, Dr. Tinker warns, or eyestrain cannot be avoided.

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CHEMISTRY

Impurities Caused Alleged Astrological Reactions

CLAIMS of Frau L. Kolisko, German astrologer, to have produced chemical reactions that change with the differing aspects of the sun, moon and planets were tested by J. Cecil Maby, and F. A. Baker, the latter a member of the British Astronomical Association.

In a report of their researches to the Journal of the Association, it is stated that the effects observed by Frau Kolisko were due to impurities and faulty technique. When careful precautions were taken, no appreciable differences were found and there was no connection with the configurations of the heavenly bodies.

Frau Kolisko's scheme was to mix a solution of silver nitrate with one of ferrous sulphate, which causes a precipitation of finely divided silver, and leaves in the solution sulphate and nitrate of iron. She dipped a strip of filter paper into it while the reaction was taking place. As the paper was wetted by the chemicals, the changes could be followed on the paper surface. The iron sulphate and nitrate are yellow, while the deposited silver is dark. She claimed the shape of the silver deposit varied with the time of day, and other changes in the relative positions of the moon and planets.

The British experimenters have found that these reactions on filter paper are extremely sensitive to slight differences in the purity, strength and temperature of the chemicals, and also to surrounding conditions, such as the moisture in the air. When particular care was taken to keep all these varying factors the same, no appreciable differences were noticed, regardless of the positions of the planets.

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ARCHAEOLOGY

Will Search for Skeletons Of America's First Hunters

HOPE of finding first skeletal remains of America's big game hunters, who shot bison in the West thousands of years ago, will carry Dr. Frank H. H. Roberts, Jr., of the Bureau of American Ethnology, back to Colorado this spring.

The expedition will be joined by Dr. Kirk Bryan, professor of geology at Harvard University, and one of his graduate students.

Last year, Dr. Roberts opened a new chapter in American ancient history by announcing discovery of what the home life of the mysterious ancient hunters of the West was like. His discovery consisted of a camp site and workshop near Fort Collins, Colorado, where the undiscovered hunters left gnawed and split animal bones, campfire ashes and stone dart points for killing their game.

By such clues as the peculiar weapons, Dr. Roberts identified the campers as "Folsom hunters." This is the name given by scientists to the unknown ancient inhabitants of America who left a trail of their characteristic "Folsom" stone weapons in many parts of this country. Their existence was first detected at Folsom, New Mexico, where the weapons lay with bones of 30 extinct bison—remains of a big hunt perhaps 10,000 or 20,000 years ago.

Bones which Dr. Roberts dug out of the Colorado camp have been examined at the Colorado Museum of Natural History. The verdict is that they include the same two species of extinct bison with large frames and long, uncurled horns which figured in the big hunt at Folsom. This confirms Dr. Roberts' view that the camp must belong to that ancient American hunting culture.

The returning expedition will seek not only traces of the hunters themselves, but also ruins of any houses or shelters they may have built, and evidences showing the geological time when they flourished.

Science News Letter, March 23, 1935

DENTISTRY

Seminoles in Florida Have Teeth Examined

FLORIDA'S picturesque Seminoles who hide in the lonely Everglades of Florida and live on their old-time diets have almost perfect teeth, the Office of Indian Affairs has been informed.

A dental survey of the 600 Seminole Indians in Florida has just been completed by Dr. Weston A. Price of Cleveland.

Those groups of Seminoles who have left the swamp land to live on the fringes of civilization and to enjoy its conveniences present an entirely different dental picture from the "wild" Seminoles, Dr. Price reports. Their contact with ways of civilized men have given them "an atrocious amount of dental decay."

Science News Letter, March 23, 1935

IN SCIE

ZOOLOGY

Fences Now Built Around Thundering Herd of West

THE BUFFALO is back on the Indian Plains in the West. The Crow Reservation in Montana and Pine Ridge Reservation of the Sioux in South Dakota have welcomed back their old familiar animal neighbor.

True, the thundering herd so far consists of fewer than 200 animals transported to the two reservations by modern and prosaic truck.

It is also true that these buffalo—or bison, as zoologists prefer to call them, despite Buffalo Bill and Wild West tradition—are fenced in. Indians at Pine Ridge themselves built the "buffalo fence." It is a long fence, to be sure, enclosing several thousand range acres, but still it is a barrier. Days when thousands of bison could sweep in mass formation across boundless miles of prairie are gone forever, the fence-building seems to admit.

Nevertheless, all the Western picturesqueness is not gone from the Indian and buffalo combination. Both reservations report that the Indians have received their herds with strong approval, and with the old characteristic Indian attitude toward wild animal life.

Said Superintendent Yellowtail of the Crow Reservation, reporting to the Office of Indian Affairs:

"The Crows are justly proud of having these animals on the reservation again and the entire community including the Northern Cheyenne country adjacent to the Crow Reservation, is watching this attempt to re-establish the buffalo in Montana with much interest. . . . It is safe to assume that within five years there will be a 'thundering herd' of buffalo on the Crow Reservation where they used to roam fifty years ago. At that time we can justly say in all proudness that 'the buffalo are here again.'"

At Pine Ridge, a large gathering of Indians witnessed the loosing of the herd in its reservation home.

Science News Letter, March 23, 1935

FIELDS

PSYCHIATRY

"Parents Take You Places" Is Child's Definition

PARENTS are people who do things for you, take you places and make things for you. This is the child's view of parents, as explained to the American Orthopsychiatric Association.

These experts on child behavior wanted to know what children think of their parents because many mental and emotional disturbances of grown-ups have been traced by psychiatrists to an overdependence of children on their parents, and much of the unhappiness and rebelliousness of adolescents is due to efforts to break away from parents.

"Mildly pleasant" is the reaction the largest number of children have to their parents, Dr. H. Meltzer, director of the psychological service center, St. Louis, found when he studied the attitudes of 150 children of elementary school age.

"The total percentages of all pleasant reactions," he reported, "including the three degrees classified—very, mildly, and barely—add up to 63.2 per cent. for both parents, 65.5 per cent. for mother and 61 per cent. for father."

Definitely unpleasant reactions, however, added up to only 5.8 per cent. for both parents, 4 per cent. for mother and 7.6 per cent. for father.

Dr. Meltzer found out the children's opinions or reaction to their parents by playing a sort of game with them. They were given certain words, such as table, school, ball park, Washington and Lincoln, and asked to speak out loud the first ten words that came to mind when thinking of these subjects. After gaining each child's confidence and assuring him that neither parents nor teachers would be told what was said, they were then asked to think out loud in this way about mother and then about father.

According to the ten responses most frequently given, father is a person who works and supports you, does things around the house, takes you out places, plays games with you, helps you with homework, participates in outdoor activities, gives you money, has such qualities as sweetness and kindness, participates in indoor activities and trains you to mind.

Mother is a person who does housework, does things for you, works and supports you, has such qualities as sweetness and kindness, takes you out places, plays games with you, helps you with housework, buys food and clothes for you, scolds you when you do wrong and gives you things.

Significant to psychiatrists was the fact that almost two-thirds of all responses given showed some form of dependence of children on their parents. Two out of every hundred were overdependent, almost half were willingly dependent, and about fourteen out of a hundred showed forced dependence. Mother rates twenty-four overdependent responses and father seventeen.

Science News Letter, March 23, 1935

CHEMISTRY

Heavy Water Tastes Like Ordinary Kind

WHEN the new "heavy water" of science is produced in sufficiently large quantities to be tried in experiments on human beings, the patients will find it tastes just like the ordinary variety.

Prof. Harold C. Urey, Nobel Prize winner in chemistry of Columbia University, and Dr. G. Failla, chief physicist of Memorial Hospital in New York, conclude from recent taste tests that "pure deuterium oxide (heavy water) has the same taste as ordinary distilled water." (*Science*, March 15).

Their test is at variance with recent reports from Oslo, Norway, where Prof. Klaus Hansen on drinking heavy water was said to have experienced a "dry burning sensation."

Prof. Urey, awarded the Nobel Prize for his discovery of the heavy isotopic "twin" of ordinary hydrogen which goes into heavy water, and Dr. Failla made the test by tasting about twenty drops each of ordinary and heavy water.

To obtain an objective test a third person prepared the totally unmarked samples for the scientists.

That the amount of water used was not too small for accurate tasting was shown, report the scientists, by the fact that they both noticed the characteristic "flat" taste of distilled water for both samples.

Science News Letter, March 23, 1935

PHYSIOLOGY

Individual Disinfecting Plant in Human Intestines

THE UPPER intestinal tract has a natural disinfecting power that, when we are in normal health, kills off most of the germs that come into the stomach by way of the mouth, says Dr. Lloyd Arnold of the University of Illinois. That is the reason why we do not have more diseases of the intestinal tract.

He and his associates have been working for twelve years, determining the bacterial flora of every inch of the digestive tract. The lower intestine is very densely populated with bacteria, he declares, while the upper intestine and the stomach have normally very little bacterial life. The secretions of the stomach and upper intestine are acid in their reaction, while in the lower intestine the reaction is alkaline. There is, however, no "gate" between the upper and lower intestines; it is the line of acidity that determines the height that the bacterial flora will ascend. Consequently, if, for any reason, the acidity of the upper digestive tract is lessened, the bacterial flora of the lower intestine may ascend even as far as the stomach, and the disinfecting power of the mucous lining of the intestine is not able to function properly.

Killing doses of cholera germs were fed to rabbits whose stomach contents were known to be acid. None of these rabbits showed any effect of the germs. The disinfecting power of the upper intestine was able to do its work. The same dose of cholera germs was given to two groups of rabbits whose stomach and upper intestinal contents had been made artificially alkaline. All the rabbits in these two groups contracted cholera and the majority died of the disease. Then a less-than-lethal dose of cholera bacilli was injected intravenously in two sets of rabbits, one with normal intestinal reaction, the other artificially alkalized. The second series became very sick, and most of them died. The other set remained healthy.

Dr. Arnold said that studies they had made showed that in very hot weather the contents of the human stomach were always less acid than in cooler weather. He attributed the prevalence of dysentery and typhoid during the hot months to this cause, and stated that if the acidity of the stomach and upper intestine is maintained at all times, few intestinal diseases can develop.

Science News Letter, March 23, 1935

PHYSICS—MILITARY SCIENCE

Death Rays? No!

This Dreadful Weapon Will Not be Used in "Next War" Because no Ray is Known That Can Kill at a Distance

By DR. FRANK THONE

WAR rumbles persistently on the horizons of the world. Smaller nations go fighting in inaccessible places like the Gran Chaco, where nobody wants to get his boots muddy trying to stop them. Mussolini swaps support to the European status quo for permission to eat up the most ancient kingdom in the world, on the African uplands. Japan boldly filches chunks of territory from prostrate China, spits defiance at preoccupied Russia, snarls truculently at a bluffed Occident. Germany suddenly roars. All civilization has the jitters, and no wonder.

Visions of the last war are enough to give us all nightmares, at the prospect that they may become realities again with hardly a day's dazed warning. Horrible enough they are, even in fifteen years' retrospect: lacerating shellfire, choking chemical vapors, tanks like dragons breathing death, planes like evil pterodactyls swooping through the clouds, devilfish submarines, spies, lies, propaganda, hysteria and hate. Must we go through all that again?

Ah, but that isn't even the beginning of it! a whole school of prophets of the newer desolation hasten to assure us. When the world again goes to war, it will be a veritable apocalypse of unspeakable slaughter and destruction. With hoarse voices these Jeremiahs tell us, with the reddest of headlines they publish it over the land: aircraft poisoning whole cities with a few ounces of "secret" new poison gases, spy-distributed germs of a dozen deaths, "rays" (secret, again!) that will paralyze aircraft engines, detonate explosives in warships' magazines, sweep whole regiments down like flies before a flame.

Death rays seem to be a favorite stock-in-trade of the vendors of wholesale death. There is no distance too great for them, no task of devastation too impossible. Science, say these Wellsian imaginers, has already assured that the next war will be a thousand-fold worse than the last one was.

But what has science itself to say? Do the actual working physicists, to whom such almost supernatural powers are imputed, really accept this lofty though sinister compliment?

They do not.

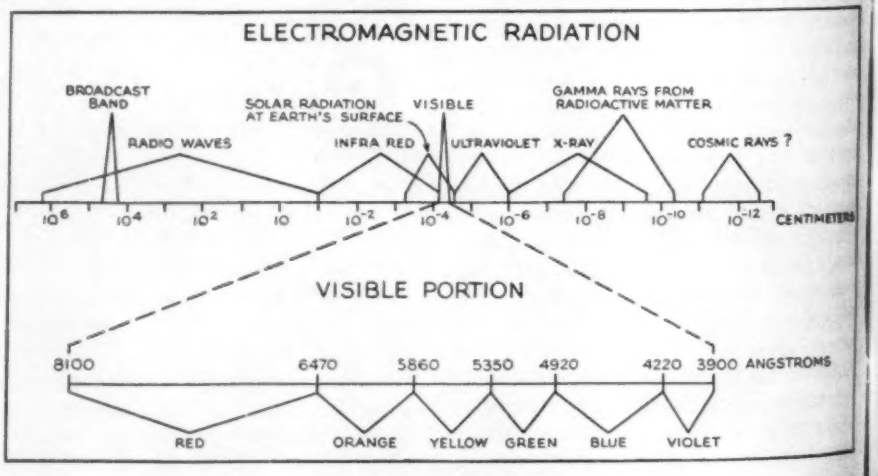
Most of them simply laugh robustly at the towering flights of fancy on the part of writers unhampered by any knowledge of science and its limitations. Some, reflective, wonder whether this persistent peddling of unreal terrors will not in the end result in a hampering of the work of science, already demanded by some of the less well-informed of humanists and legislators. But all agree in a single, forcible verdict: "Bunk!"

Not only are there no known rays that can be used to kill or destroy at a distance, but it is extremely unlikely that any such rays ever will be discovered. For scientists have made a pretty complete catalog of all possible kinds of rays, and nowhere among them is there a type that has all the requirements: long range, destructive energy at the far end of that long range, ability to pierce or break any defenses, simplicity in production, and safety to the "gun crew" directing the apparatus.

Some rays are destructive, but they are short-ranged. Some are penetrating, but relatively harmless. Some are long-ranged, but have no penetrating or destructive power. And so it goes. If a ray meeting all the requirements needed to make it even as useful in war as a small-caliber field gun is ever to be devised, it will have to come from outside the present knowledge of the combined brains of the best physicists in the world. They know of nothing of the kind, and they do not ever expect to know.

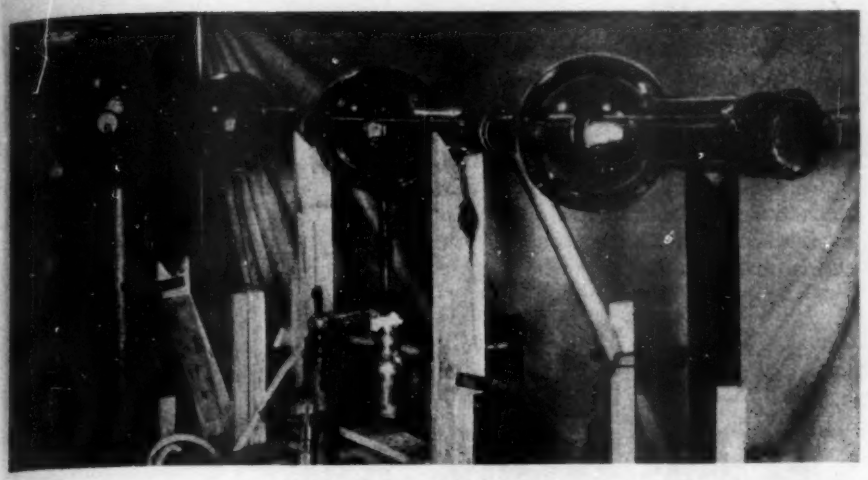
The physicists make no secret of the kinds of rays they know about, as do the proclaimers of the "secret" rays of death. They spread the catalog out, for the whole world to see, and explain each kind of ray patiently to anyone who will listen.

There are three general classes of things that may be called rays. First and largest and best known is the class called the electromagnetic waves. This includes all vibrations in the hypothetical "ether," from the mile-long radio waves through visible light out into ultraviolet, X-rays and the highly penetrating radiations known as cosmic rays. Second is a class of things that probably should be called sprays or streams instead of rays, for they consist of jets or beams of particles rather than waves like light. This class includes things never seen outside the laboratory: alpha and beta particles, electrons, neutrons and things like that. Third is a class that can be called "rays" only by courtesy; it consists of narrow beams



RANGE OF RAYS

All known kinds of electromagnetic rays are represented on this physicist's chart. None of them is in any military sense a "death ray."



NOT A WEAPON

Looking at the "muzzle" of the most powerful Coolidge cathode ray tube. Its range is only a few feet, and its construction is obviously most un-military.

of directed sound waves, and waves resembling sound but so rapid as to be unheard.

All known "rays" are included in these three classes, and there are none among them that can be called deadly, at least in any military sense.

Let us look at a few of them, one by one, in greater particular.

Suppose we start with the most familiar of the electromagnetic rays, the ones our eyes can see, which we class together as "visible light." Nothing deadly here. Light has long enough range to suit the most exacting of gunners; it goes with unimaginable speed in a direct line through quintillions of miles of space. But it kills nothing, destroys nothing.

Yet, curiously, the only successful "death ray" ever used, if somewhat hazy history can be credited, was sunlight. When the ancient Romans were besieging Syracuse (Sicily, not N. Y.), the great Greek mathematician and physicist Archimedes aided the defenders with many ingenious devices, among them mirrors, which directed the sun's rays on the Roman ships and caused them to take fire. It is not impossible that Archimedes, who was a sort of early Edison, might have known the trick of focusing light to a burning point with concave mirrors. But such use of sun-rays for death-rays was practicable only in the days of close-up sword-and-spear fighting.

Visible light is only a very small part of the whole range of electromagnetic vibrations. Beyond the dullest red that our eyes can see is a fairly wide sector of "infra-red" rays, loosely definable as heat rays. Some of these are useful in medicine; in judicious doses they bake various aches and ails out of our afflicted flesh. As with all medicines, overdoses are harmful. Too much infra-red, and you burn to death. Probably the larger part of the mischief wrought by Archimedes' semi-legendary mirrors was done not by visible sunlight but by invisible solar infra-red. But nobody has ever suggested any way of concentrating these rays at a distance with sufficient intensity to do an enemy any harm.

As visible light merges into infra-red, so the latter rays at their lower margin merge into the radio waves. These have the widest range of wavelengths in the whole electromagnetic series, from a small fraction of an inch to an extreme of several miles. Only a small fraction of known radio wavelengths are used in broadcasting. The shortest radio waves are also used in medicine, to create artificial fevers that help cure certain diseases. Presumably too much of such radio-fever might be fatal to a man. But to get such a rise in body temperature at all, the patient must be at very close quarters with a very powerful generating set. It would be too much to ask of any soldier, to expect him to walk up to a shortwave set and stand there an hour or so while it cooked him inside.

So from visible light on down to the longest known radio wavelengths, there are no death rays in sight. What about the other half of the electromagnetic wave series?

Immediately above the highest visible violet, there is a fairly wide region, the ultraviolet. The shorter ultraviolet waves are known to be distinctly harmful, even in relatively small doses. Their effects we term, loosely, sunstroke and snow-blindness. But nobody has yet devised any ultraviolet projector that will blind or knock out a man in a moment at even a moderate distance. Ultraviolet lamps will probably continue to be boudoir rather than battlefield equipment for some time to come.

Both Good and Evil

Ultraviolet, at its upper border, gives way to X-rays, which like all the rays in the series carry either blessing or bane, according to the manner of their use. They are so powerful as to be dangerous: unless the manipulators protect themselves properly. They can even penetrate metals, in their shorter, "harder" wavelengths. But they do not act quickly enough to have military value, their range is comparatively short, and they require ponderous, delicate, easily dislocated machinery for their generation. They are true death-rays in the laboratory, but not in the field.

Beyond the X-rays, and overlapping them to some extent, are gamma rays from radium. Gamma rays have also been produced by artificial laboratory means during recent years. These rays are even more penetrating than X-rays, and they are capable of doing a good deal of mischief. Only there is such a limited quantity of radium available, and it is so terrifically expensive, and the range of the gamma rays is so short, that it would on the whole probably be cheaper and more productive of results to go out and hew at your foeman's head with a battleax than to try to kill him with these rays.

Most Penetrating

Beyond the gamma ray range there are no known rays except cosmic rays. Nobody knows exactly what their wavelengths are, but they are exceedingly short—probably on the order of a millionth of a centimeter. They come from parts as yet quite unknown, but not unlikely at immense distances in space, so that their range is possibly as long as that of light. They are the most penetrating things known anywhere: they will pass through feet of solid lead, through scores of feet of water.

And they are completely harmless. Millions of them drill straight through our bodies every day, and we never feel or know it. It has even been suggested that we need them in order to remain alive.

So we have ranged through the whole known electromagnetic wave

series, and not found a possible death ray anywhere. How about the second class, the rays composed of streams or jets of atom-fragments or other minute particles?

There are a number of these, some of them of quite recent discovery, so that not all their properties are exactly known. These particle-projectiles include such things as electrons, protons, positrons, neutrons, deutons, positive ions and alpha particles. They consist variously of single fragments of atom construction (electrons, positrons, etc.) or of atoms that have lost a small part of themselves (alpha particles and positive ions). They may have high velocity, but usually low penetrating power, and without exception their ranges are short—seldom more than a fraction of an inch. Obviously not much military possibility there.

Destructive Cathode Rays

The nearest approach to a "death ray" that has ever been made with these streams of electrical particles was the production of massive quantities of cathode rays, or electrons, into the air. This was done on a pioneer scale first by a German physicist, Lenard; then with an improved and much more massive apparatus by Dr. W. D. Coolidge, director of the General Electric research laboratories.

The Coolidge cathode ray tubes shot their streams of high-speed electrons out into the air to an extreme range of several feet. They did strange things to chemical substances, indicating that they might have deadly effect on living animals. The ear of a rabbit was placed in their path, with the rest of the animal shielded from the rays. The rays that went through the openings in the shield that protected most of the ear caused sore spots to appear, which presently healed over, leaving no trace except that the new hair was white. So not even the ponderous Coolidge tube could be counted a long-range death-ray producer.

Supersonic Killers

There remains, then, the third class of possible death rays, the highly intense beams of inaudible or shrilly audible sound waves, first used for experimental destruction in the private laboratory of A. L. Loomis, New York banker-scientist. These proved their power to kill such things as small fish, water plants, and (sometimes) bacteria; but they could not kill a mouse. Moreover, they could act only in water or other fluid, not in air, and had at best a range of mere inches, even though enough power was poured into them to run a full-sized broadcasting station.

So our survey of the whole field of rays of all kinds yields us not one that holds out any possibility of being a genuine death ray. If the youth of the present generation must presently go to the trenches, they will have to be contented with modification and improvements of the lethal toys their fathers and uncles used in 1918. The lightnings of Jove are still denied to war-making earthlings.

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Science News Letter, March 23, 1935

BOTANY

Famous Insect-Eating Plant Catches Many Spiders

See Front Cover

VENUS' flytrap might with equal correctness be called a spider-trap. This famous insect-catching plant, once called by Darwin "the most wonderful plant in the world," has been re-studied recently by Prof. Robert F. Griggs of George Washington University. He discovered that the largest single class of animals among its victims consists of spiders. Examination of hundreds of its trap-like hinged leaves showed that spiders formed 28 per cent. of all its catch. Flies were a close second, with 24 per cent.

Other prey included beetles, ants and roaches. There was one tiny toad, a scorpion, a couple of snails and one daddylonglegs. In general, the plant's victims were mainly insects that fly little or not at all; there were few highly active fliers like bees and wasps.

Prof. Griggs made an effort to find an answer to the old question of what use the plant's carnivorous tendencies are to it; for though it secretes a ferment like the gastric juice, it has never been proved that it uses the captured victims for food. He was not able, however, to arrive at any completely conclusive findings, for specimens grown in various types of soil, some fed and others kept without insects, all throve about equally.

It is probable that the species once had a far greater range than its present restricted area of about a hundred-mile radius of semi-swampy costal plain around the city of Wilmington, N. C. Its nearest existing relative is found in Europe. Two colonies of it were experimentally transplanted into bogs far to the north of its present habitat some years ago. One of these is in Maryland just outside the District of Columbia, the other in Virginia. Both colonies survived the severe winter of 1933-34, which was far colder than anything these plants have been called upon to endure for probably thousands of years.

Prof. Griggs expressed the wish that people generally might abandon the rather awkward and unbeautiful name, Venus' flytrap, and adopt the more euphonious botanical name, *Dionaea*, for common use, as they have already englished such strictly scientific names as chrysanthemum, rhododendron and gladiolus.

One of Prof. Griggs' photographs, taken in the native haunts of *Dionaea*, is shown on the cover of this issue of the SCIENCE NEWS LETTER. It shows the hinged halves of a leaf as they slowly open, disclosing the empty shell of a luckless large fly that was not quick enough to escape the snap of their trap-like action. Wind or a raindrop will clear away the victim's carcass, leaving the hungry leaves ready for another catch. In the meantime, two other empty leaves wait with deadly patience.

Science News Letter, March 23, 1935

RADIO

Tuesday, March 26, 4:30 p. m.

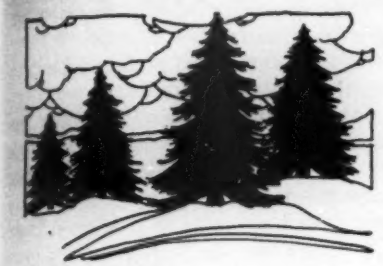
WHY TAKE THE SUN FOR GRANTED? by Dr. Donald H. Menzel, Harvard College Observatory.

Tuesday, April 2, 4:30 p. m.

WHAT IS BELOW GROUND? by Dr. Charles Thom, Principal Mycologist of the Bureau of Plant Industry, U. S. Department of Agriculture.

In the Science Service series of radio addresses given by eminent scientists over the Columbia Broadcasting System.

NATURE RAMBLINGS by Frank Thone



Spring Baths for Trees

MARCH is a good time to give city trees and shrubs a good thorough-going bath, with soap and water, advises L. B. Sisson, industrial fellow at the Mellon Institute of Industrial Research, Pittsburgh. This is especially recommended in the case of evergreens, to rid their leaves of their overcoats of soot acquired during the winter.

"It seems not to be generally understood," he states, "that this coating is impervious to sunlight and that rain will not remove it. Therefore, unwashed plants may starve regardless of the amount of sunlight available to them.

"At the start of the growing season, evergreens depend on their older leaves to function as food factories. Sunlight being one of the necessary elements in the making of food, it is obvious that when these older leaves are sealed against sunlight they can not and do not operate as they should."

For small trees and shrubs, Mr. Sisson recommends a thorough sponging by hand, using a suds of pure soap and water, with the addition of a little sodium metaphosphate as a water softener. Larger trees of course require the use of a power spray pump, with a good hosing off afterwards.

Trees that will grow in smoky cities are a very small company. If your town is really thoroughly committed to a pall of industrial and domestic smoke, it is of little use to attempt evergreens. Favorite among harassed city foresters is the European sycamore, or more properly plane-tree. It seems to have very high resistance to soot.

Another fairly successful smoke-fighter is the ginkgo, known also as the maiden-hair tree because its leaves resemble those of the maiden-hair fern. It has been a town tree for centuries in China and Japan, and it has been transplanted successfully into temperate countries everywhere. There are young ginkgos around the Battery in New York, and Washington, D. C., has many magnificent mature specimens.

The chinaberry, which grows everywhere in the South, is credited with being able to withstand city conditions, but it will not thrive in the colder northern latitudes.

A third smoke-resisting Oriental immigrant is the ailanthus. This will grow where even the European sycamore is choked out; it is the last green thing left alive in the desolate backyard deserts of tenement districts. In one of his most poignant short stories, the late O. Henry made effective use of a description of one of these trees, whose name apparently he did not know. Perhaps it was just as well; it might have been just one more turn than the heart-strings of his readers could have endured, had he mentioned that the other name of ailanthus is "Tree of Heaven."

Science News Letter, March 23, 1935

ARCHAEOLOGY-SURGERY

Cutting Hole in Head Was Ancient Cure for Sinus

Evidence of Prehistoric Suffering and Surgery Revealed by Skulls Unearthed at Monte Alban

CURING sinus trouble by the heroic remedy of cutting a hole in the aching head was attempted by Indian surgeons in prehistoric American civilization, discoveries in Mexico reveal.

The operation was a technical success, perfect—slightly marred by the fact that the patient died.

Two cases of ancient skull surgery, one identified as a serious sinus case, have been found at Monte Alban, Mexico's prehistoric city famed for its treasure tomb revelations and other evidences of a remarkable civilization which Mexican archaeologists are now uncovering.

The prehistoric sinus sufferer's condition is shown by bony degeneration above the left eye, according to Dr. Daniel de la Borbolla, anthropologist of the Monte Alban expedition. The Indian doctor cut a small round hole less than an inch in diameter, whether to release pressure or to let out evil spirits, no one will ever know.

A second skull found immediately after the first discovery also bears marks of this prehistoric skull cutting known as trepanning. This patient, however, had better adjustment of bony tissue following the operation, suggesting that he survived for a while, at least.

Present explorations at the remarkable mountain top city of Monte Alban are about to end. Funds from private sources, with which Dr. Alfonso Caso, leader of the expedition, has attempted to maintain the work, are exhausted. Dr. Caso, discoverer of the Monte Alban treasure of 1932, Dr. Borbolla, staff anthropologist, and other Mexican scientists, were relieved of their official positions when the present administration went into power in Mexico at the end of 1934. Largely through personal efforts of staff members, the Monte Alban explorations were carried on this year.

Important evidence—although not conclusive—has been found that the peak period of Monte Alban's history was about 300 to 500 A. D. This would make Monte Alban contemporaneous with the early era of the great Mayan empire, which lay farther south and east.

Another important discovery this year is a tomb with many hieroglyphs. These may throw new light on Zapotecan Indian script, which is a far greater mystery than Mayan or Aztec writing.

Science News Letter, March 23, 1935

Automobile horns and traffic whistles are banned in the streets of Rome.

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ARCHAEOLOGY

Tree Ring Calendar May Date Prehistoric Diseases

USING a calendar of tree rings, complete from the seventh century A. D. down to the present, archaeologist hope to date diseases that plagued prehistoric Americans of the Southwest.

Burial grounds of Southwestern Indians are yielding rich discoveries for an understanding of diseases in America before white men came, says Dr. John H. Provinse, assistant professor of archaeology at the University of Arizona, who is studying diseases that marked the bones.

"Reasonably conclusive" diagnosis of seven diseases that troubled American Indians in Arizona has been made, Dr. Provinse said. An eighth disease, syphilis, is doubtful, inasmuch as other diseases might have left the perforated palates, thickened long bones and other conditions that suggest this malady.

The moot question of origin of syphilis in the Old World or the New may be settled, said Dr. Provinse, by further study of pathological bones in the Southwest, and by careful checking with the tree-ring dating charts developed by Dr. A. E. Douglass, astronomer of the University of Arizona. The charts, which set in sequence annual growth rings of trees representing dates for many centuries, have enabled archaeologists to discover the ages of over 90 pueblos and cliff dwellings. If fragments of wood, associated with burials of diseased Indians, can be dated by matching growth rings to dated rings of the tree-ring calendar, then dates in America's ancient medical history can be established. Syphilis, in particular, is not yet proved to have existed in America before coming of Europeans.

Among the ancient American diseases diagnosed by Dr. Provinse in the bones he has studied are Pott's disease or tuberculosis of the spine; rickets; osteomalacia, a nutrition disorder of adult women resembling rickets; arthritis, and Paget's disease, which distorted the bones, with such deformities as a bowing of the lower leg.

Science News Letter, March 23, 1935

PUBLIC HEALTH

Antitoxin Like Whiskey Improves With Age

PUBLIC indignation was recently aroused over distribution by a Pennsylvania State Health Department official of allegedly "stale" diphtheria antitoxin which was said to have caused the death of at least one child. In the discussions which ensued in the press and over the air, scientific aspects of the situation seem to have been overlooked.

The questions of breach of faith on the part of the health official and of possible collusion between him and the manufacturer of the antitoxin may be left for the courts to decide.

The question of the freshness and potency of the antitoxin can be settled by science.

Samples from the same lot as that alleged to have caused the death of the child and from other lots manufactured by the same laboratory have been examined by the U. S. Public Health Service, which controls the interstate sale of biological products like diphtheria antitoxin. These samples were found fully potent.

Health officers and physicians throughout the country have since been advised by the federal health service that antitoxin from this laboratory is perfectly safe. The federal health authorities have found no reason to revoke the laboratory's license.

The bogeyman of "stale" antitoxin can also be laid by science.

Freshness is important with most biologicals such as serums and vaccines but not with diphtheria antitoxin. Redating antitoxin after samples of a lot have been tested is accepted practice. There is even an advantage in using antitoxin that is not brand new. In the words of one health officer, diphtheria antitoxin, like whiskey, improves with age.

Experienced physicians prefer to use diphtheria antitoxin that has aged at least one year because the older product, while still able to neutralize the poison that the diphtheria germs are spreading through the body, causes a less severe reaction when given to the patient.

Science News Letter, March 23, 1935

METEOROLOGY

Groundhog No Prophet; Guessed Wrong Again

POOR old Groundhog—he guessed wrong again!

On Feb. 2, Groundhog Day, there was bright weather over most of the country, Weather Bureau records show. Therefore, the Groundhog saw his shadow—or could have, if he had looked. Therefore, the weather should have been wintry for six weeks more.

Was it? It was not! The same Weather Bureau records show that over almost the entire United States the crucial six weeks were mild and balmy, except for a couple of quite ordinary cold snaps. Temperatures were well above normal, especially in the Northwest.

The joke, however, is not on the Groundhog, but on those who believe in him as a weather prophet. Sunny though the weather was on his special day, he did not see his shadow. The reason is that all groundhogs are sound sleepers, continuing their winter naps until well toward the end of March in all except the extreme southern part of the groundhog range. Any one of the furry little animals that is out of his burrow even now is, relatively speaking, a sufferer from insomnia.

Science News Letter, March 23, 1935

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First Glances at New Books

Biography

YOUNG WARD'S DIARY — Lester Ward. Edited by Bernhard J. Stern—*Putnam*, 321 p., $3. Intimate and frank comments on the life of a remarkable young man living during the lively days of 1860-1870. In these pages you can learn much of the customs of the country people in Pennsylvania and officialdom in Washington, and you may be thrilled by the ambition which brought this youngster through all sorts of hardships, caused him to rise at five a. m. to study before his work, made him persuade officials of Columbian College in Washington to start evening classes so that he and other Government clerks could go to college, and made it possible for him to own a beautiful house with new bath tub and gas lights and "the most superb piano in the city." You may be touched by the great affection he had for his brilliant wife.

Science News Letter, March 23, 1935

Exploration

UNROLLING THE MAP, THE STORY OF EXPLORATION—Leonard Outhwaite; Drawings of ships by Gordon Grant—*Reynal & Hitchcock*, 351 p., $3.75. A vivid narrative, popular in style, yet surprisingly comprehensive. It begins with the first of known explorers, Hannu the Egyptian who voyaged to Punt, and ends with brief mention of the new, third dimension which explorers are now entering in their efforts to find out more about stratosphere heights and ocean depths. The numerous maps, list of books for suggested reading, and the index are good features.

Science News Letter, March 23, 1935

Education

EDUCATION FOR DEMOCRACY—J. B. Johnston—*University of Minnesota*, 280 p., $2.50. A collection of essays on higher education addressed to teachers, parents of students, and the taxpayers who have an interest in the support of education for young citizens.

Science News Letter, March 23, 1935

Nutrition

FOOD FOR THE YOUNG CHILD—Miriam E. Lowenberg — *Collegiate Press*, 142 p., $1.50. Menus, recipes and practical advice on what to feed children and how to make them eat it are given here for the benefit of mothers and those in charge of meals at nursery schools. The recipes are given in two proportions—family size and nursery school size. The advice on how to teach children to eat looks particularly helpful. The author calls attention to the importance not only of flavor and appearance of foods but also to their texture and the ease or difficulty small fingers have in manipulating them onto spoon or fork and into the mouth.

Science News Letter, March 23, 1935

Child Study

CHILDREN OF THE NEW DAY—Katherine Glover and Evelyn Dewey—*Appleton*, 332 p., $2.25. A book intended to interpret the thoughts and facts brought together by the experts gathered for the White House Conference on Child Health and Protection. For the guidance of parents and educators is surveyed the mental and physical development of the child, the environment in which they live, and problems of their education.

Science News Letter, March 23, 1935

Sociology

SOCIAL WELFARE IN THE NATIONAL RECOVERY PROGRAM—James H. S. Bossard—*American Academy of Political and Social Science*, 269 p., $2.50 cloth, $2.00 paper. One of the "Annals" of the American Academy devoted mainly to an appraisal of the "New Deal", its cost, accomplishments, and future plans. The volume includes also a monograph on "The Conduct of German Foreign Affairs" by Dr. Frederick L. Schuman.

Science News Letter, March 23, 1935

Child Study

COMMON SENSE FOR MOTHERS—Mrs. John S. Reilly—*Funk and Wagnalls*, 380 p., $2. This practical book by the mother of seven children will answer many of the questions in the minds of parents; what to prepare for the new baby; how to get young children quietly to sleep; what to say when the older boy wants to take the family car for the evening.

Science News Letter, March 23, 1935

Ornithology

A GUIDE TO BIRD SONGS—Aretas A. Saunders—*Appleton-Century*, 285 p., $2.50 Mr. Saunders introduces a new method of notation for bird songs, departing from the really inadequate conventions based on the diatonic scale of human performance. He uses simple lines, horizontal length indicating length of note, vertical distance indicating changes in pitch, curves to show slurring effects, with accompanying "syllables" to approximate sound-quality. The text gives brief but careful description of the birds' appearance.

Science News Letter, March 23, 1935

Orthopedics

LIMBS FOR THE LIMBLESS—John Culbert Faries—*Institute for the Crippled and Disabled*, 104 p., $2. Although this book is the outgrowth of lectures on artificial limbs given to surgeons attending the orthopedic seminar at the New York Post-Graduate Medical School, it has been written in a way to help both patient and surgeon. The more technical parts that will interest the surgeon are relegated to the latter part of the book. The author gives expert advice on the appliances and what may be expected from them which should contribute much to the comfort and morale of persons obliged to use artificial limbs.

Science News Letter, March 23, 1935

Biochemistry

NEW CONCEPTIONS IN BIOCHEMISTRY—N. R. Dhar—*Indian Drug House, Allahabad, India*, 168 p., $2 plus postage. A technical book of interest chiefly to medical scientists. The author is professor of chemistry in Allahabad University, India.

Science News Letter, March 23, 1935

Psychic Research

EXTRA-SENSORY PERCEPTION—J. B. Rhine—*Bruce Humphries*, 169 p., $2.50. Previously published by the *Boston Society for Psychic Research;* see review in SCIENCE NEWS LETTER of June 23, 1934.

Science News Letter, March 23, 1935

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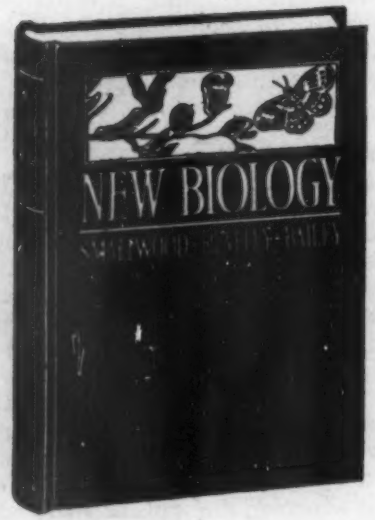
BIOLOGY: How does it Educate?

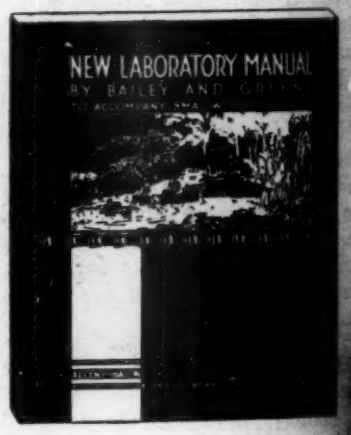
GENERAL biology offers the pupil a dramatic experience in a new realm of interest, with new tools and a new point of view.

For the young pupil there is romance in the discoveries of great biologists which have done so much to benefit humankind,—in the persistent warfare which the quiet Pasteur waged against disease, in Harvey's tireless effort which resulted in the discovery of the life-stream, in Koch's activities which resulted in the increasing control of the white plague.



In general, biology is the study of the fundamental functions of living things, thus enriching the student's own life; in particular, it is the creating of scientific attitudes toward ourselves and our living environment. It parallels in its objectives the cardinal aims of education.

The biological unit is the *living* individual. It is through the study of the life processes common to all living things that the fundamental facts of human living are learned. Out of this mass of old and new facts comes the knowledge of the interrelationship of man to the plant and animal world. The need for conservation of plant and animal life and the need of development and improvement of all living organisms result as a natural corollary.



The textbook is the medium for transmitting facts. It should not only teem with facts, but it must provide a program of pupil activities. It must furnish plenty of indoor laboratory work for the discovering of facts and proof, and field work for stimulating interest in life processes. It must emphasize Health by establishing habits of physical and mental well-being; Vocation by discovering interests and aptitudes as a help in vocational guidance; Leisure by developing leisure-time activities; Citizenship by presenting situations which have direct bearing on home life, group conduct, and human service.

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